NATURAL RESOURCES AND ENVIRONMENTAL PROTECTION CABINET
Department for Environmental Protection
Division of Water

401 KAR 5:031. Surface water standards.

RELATES TO: KRS 146.200 to 146.360, 146.410 to 146.535, 146.550 to 146.570, 146.600 to 146.619, 146.990, 224.01-010, 224.01-400, 224.16-050, 224.16-070, 224.70-100 to 224.70-140, 224.71-100 to 224.71-145, 224.73-100 to 224.73-120

STATUTORY AUTHORITY: KRS 146.220, 146.241, 146.270, 146.410, 146.450, 146.460, 146.465, 224.10-100, 224.16-050, 224.16-060, 224.70-100, 224.70-110, 40 C.F.R. Part 131, 16 U.S.C. 1271 et seq., 1531 et seq., 33 U.S.C. 1311, 1313, 1314, 1341

NECESSITY, FUNCTION, AND CONFORMITY: KRS 224.10-100 requires the Natural Resources and Environmental Protection Cabinet to develop and conduct a comprehensive program for the management of water resources and to provide for the prevention, abatement, and control of water pollution. This administrative regulation and 401 KAR 5:002, 5:026, 5:029, and 5:030 establish procedures to protect the surface waters of the Commonwealth, and thus protect water resources. This administrative regulation establishes water quality standards which consist of designated legitimate uses of the surface waters of the Commonwealth and the associated water quality criteria necessary to protect those uses. These water quality standards are minimum requirements that apply to all surface waters in the Commonwealth of Kentucky in order to maintain and protect them for designated uses. These water quality standards are subject to periodic review and revision in accordance with federal and state laws.

Section 1. Nutrient Limits. In lakes and reservoirs and their tributaries, and other surface waters where eutrophication problems may exist, nitrogen, phosphorus, carbon, and contributing trace element discharges shall be limited in accordance with:

(1) The scope of the problem;
(2) The geography of the affected area; and
(3) Relative contributions from existing and proposed sources.

Section 2. Minimum Criteria Applicable to All Surface Waters. (1) The following minimum water quality criteria are applicable to all surface waters including mixing zones, with the exception that toxicity to aquatic life in mixing zones shall be subject to the provisions of 401 KAR 5:029, Section 4. Surface waters shall not be aesthetically or otherwise degraded by substances that:

(a) Settle to form objectionable deposits;
(b) Float as debris, scum, oil, or other matter to form a nuisance;
(c) Produce objectionable color, odor, taste, or turbidity;
(d) Injure, are chronically or acutely toxic to or produce adverse physiological or behavioral responses in humans, animals, fish and other aquatic life;

(e) Produce undesirable aquatic life or result in the dominance of nuisance species;

(f) Cause fish flesh tainting. The concentration of all phenolic compounds which cause fish flesh tainting shall not exceed five (5) µg/l as an instream value;

(g) Cause the following changes in radionuclides:

1. The gross total alpha particle activity, including radium-226 but excluding radon and uranium, to exceed fifteen (15) pCi/l;

2. Combined radium-226 and radium-228 to exceed five (5) pCi/l. Specific determinations of radium-226 and radium-228 are not necessary if dissolved gross alpha particle activity does not exceed five (5) pCi/l;

3. The concentration of total gross beta particle activity to exceed fifty (50) pCi/l;

4. The concentration of tritium to exceed 20,000 pCi/l;

5. The concentration of total Strontium-90 to exceed eight (8) pCi/l;

6. The concentration of uranium to exceed thirty (30) µg/l.

(2) The water quality criteria for the protection of human health related to fish consumption in Table 1 of Section 6 of this administrative regulation are applicable to all surface water at the edge of the assigned mixing zones except for those points where water is withdrawn for domestic water supply use. The criteria are established to protect human health from the consumption of fish tissue, and shall not be exceeded. For those substances associated with a cancer risk, an acceptable risk level of no more than one (1) additional cancer case in a population of 1,000,000 people, or 1 x 10^{-6} shall be utilized to establish the allowable concentration.

Section 3. Use Designations and Associated Criteria. (1) Surface waters may be designated as having one (1) or more legitimate uses and associated criteria protective of those uses. Those uses are listed in 401 KAR 5:026. Nothing in this administrative regulation shall be construed to prohibit or impair the legitimate beneficial uses of these waters. The criteria in Sections 2, 4, 6, and 7 of this administrative regulation represent minimum conditions necessary to:

(a) Protect surface waters for the indicated use; and

(b) Protect human health from fish consumption.

(2) On occasion, surface water quality may be outside of the limits established to protect designated uses because of natural conditions. If this occurs during periods when stream flows are below the flow that is used by the cabinet to establish effluent limitations for wastewater treatment facilities, a discharger shall not be considered a contributor to instream violations of water quality standards, if treatment results in compliance with permit requirements.

(3) Stream flows for water quality-based permits. The following stream flows shall be utilized if deriving KPDES permit limitations to protect surface waters for the listed uses and purposes:

(a) Aquatic life protection shall be $7Q_{10}$;

(b) Water-based recreation protection shall be $7Q_{10}$;

(c) Domestic water supply protection shall be determined at points of withdrawal as:

1. The harmonic mean for cancer-linked substances; and

2. $7Q_{10}$ for noncancer-linked substances;

(d) Human health protection from fish consumption and for changes in radionuclides shall be the harmonic mean; and

(e) Protection of aesthetics shall be $7Q_{10}$.

Section 4. Aquatic Life. (1) Warm water aquatic habitat. The following parameters and associated criteria shall apply for the protection of productive warm water aquatic communities,

fowl, animal wildlife, arboreous growth, agricultural, and industrial uses:

(a) Natural alkalinity as $CaCO_3$ shall not be reduced by more than twenty-five (25) percent. If natural alkalinity is below twenty (20) mg/l $CaCO_3$, there shall not be a reduction below the natural level. Alkalinity shall not be reduced or increased to a degree which may adversely affect the aquatic community.

(b) pH shall not be less than six and zero-tenths (6.0) nor more than nine and zero-tenths (9.0) and shall not fluctuate more than one and zero-tenths (1.0) pH unit over a period of twenty-four (24) hours.

(c) Flow shall not be altered to a degree which will adversely affect the aquatic community.

(d) Temperature shall not exceed thirty-one and seven-tenths (31.7) degrees Celsius (eighty-nine (89) degrees Fahrenheit).

1. The normal daily and seasonal temperature fluctuations that existed before the addition of heat due to other than natural causes shall be maintained.

2. The cabinet may determine allowable surface water temperatures on a site-specific basis utilizing available data which shall be based on the effects of temperature on the aquatic biota which utilize specific surface waters of the Commonwealth and which may be affected by person-induced temperature changes. Effects on downstream uses will also be considered in determining site-specific temperatures. Values in the following table are guidelines for surface water temperature.

Month/Date	Period Average (°F)	Instantaneous Maximum (°F)
January 1-31	45	50
February 1-29	45	50
March 1-15	51	56
March 16-31	54	59
April 1-15	58	64
April 16-30	64	69
May 1-15	68	73
May 16-31	75	80
June 1-15	80	85
June 16-30	83	87
July 1-31	84	89
August 1-31	84	89
September 1-15	84	87
September 16-30	82	86
October 1-15	77	82
October 16-31	72	77
November 1-30	67	72
December 1-31	52	57

3. A successful demonstration concerning thermal discharge limits carried out under Section 316(a) of the Clean Water Act shall constitute compliance with the temperature requirements of this subsection. A successful demonstration assures the protection and propagation of a balanced indigenous population of shellfish, fish and wildlife in or on the water into which the discharge is made.

(e) Dissolved oxygen.

1. Dissolved oxygen shall be maintained at a minimum concentration of five and zero tenths (5.0) mg/l daily average; the instantaneous minimum shall not be less than four and zero-tenths (4.0) mg/l.

2. The dissolved oxygen concentration shall be measured at middepth in waters having a total depth of ten (10) feet or less and at representative depths in other waters.

(f) Total dissolved solids or specific conductance. Total dissolved solids or specific conductance shall not be changed to the extent that the indigenous aquatic community is adversely affected.

(g) Total suspended solids. Total suspended solids shall not be changed to the extent that the indigenous aquatic community is adversely affected.

(h) Settleable solids. The addition of settleable solids that may alter the stream bottom so as to adversely affect productive aquatic communities is prohibited.

(i) Ammonia. The concentration of the un-ionized form shall not be greater than 0.05 mg/l at any time instream after mixing. Un-ionized ammonia shall be determined from values for total ammonia-N, in mg/l, pH and temperature, by means of the following equation:

$Y = 1.2 \text{ (Total ammonia-N)}/(1 + 10^{pKa-pH})$

$pk_a = 0.0902 + (2730/(273.2 + T_c))$

Where:

T_c = temperature, degrees Celsius.

Y = un-ionized ammonia (mg/l).

(j) Toxics.

1. The allowable instream concentration of toxic substances, or whole effluents containing toxic substances, which are noncumulative or nonpersistent with a half-life of less than ninety-six (96) hours, shall not exceed:

a. One-tenth (0.1) of the ninety-six (96) hour median lethal concentration (LC_{50}) of representative indigenous or indicator aquatic organisms; or

b. A chronic toxicity unit of 1.00 utilizing the twenty-five (25) percent inhibition concentration, or LC_{25}.

2. The allowable instream concentration of toxic substances, or whole effluents containing toxic substances, which are bioaccumulative or persistent, including pesticides, if not specified elsewhere in this section, shall not exceed:

a. 0.01 of the ninety-six (96) hour median lethal concentration (LC_{50}) of representative indigenous or indicator aquatic organisms; or

b. A chronic toxicity unit of 1.00 utilizing the IC_{25}.

3. In the absence of acute criteria for pollutants listed in Table 1 of Section 6 of this administrative regulation or for other substances known to be toxic but not listed in this administrative regulation, or for whole effluents which are acutely toxic, the allowable instream concentration shall not exceed the LC_1 or one-third (1/3) LC_{50} concentration derived from toxicity tests on representative indigenous or indicator aquatic organisms or exceed three-tenths (0.3) acute toxicity units.

4. If specific application factors have been determined for a toxic substance or whole effluent such as an acute to chronic ratio or water effect ratio, they may be used instead of the one-tenth (0.1) and 0.01 factors listed in this subsection upon approval by the cabinet.

5. Allowable instream concentrations for specific pollutants for the protection of warm water

aquatic habitat are listed in Table 1 of Section 6 of this administrative regulation. These concentrations are based on protecting aquatic life from acute and chronic toxicity and shall not be exceeded.

(k) Total residual chlorine. Instream concentrations for total residual chlorine shall not exceed an acute criteria value of nineteen (19) µg/l or a chronic criteria value of eleven (11) µg/l.

(2) Cold water aquatic habitat. The following parameters and criteria are for the protection of productive cold water aquatic communities and streams that support trout populations, whether self-sustaining or reproducing, on a year-round basis. The criteria adopted for the protection of warm water aquatic life also apply to the protection of cold water habitats with the following additions:

(a) Dissolved oxygen.

1. A minimum concentration of six and zero-tenths (6.0) mg/l as a daily average and five and zero-tenths (5.0) mg/l as an instantaneous minimum shall be maintained.

2. In lakes and reservoirs that support trout, the concentration of dissolved oxygen in waters below the epilimnion shall be kept consistent with natural water quality.

(b) Temperature. Water temperature shall not be increased through human activities above the natural seasonal temperatures.

Section 5. Domestic Water Supply Use. Maximum allowable in-stream concentrations for specific substances, to be applicable at the point of withdrawal for use for domestic water supply from surface water sources are specified in Table 1 of Section 6 of this administrative regulation and shall not be exceeded.

Section 6. Pollutants. Allowable instream concentrations of pollutants are listed in Table 1 of this section.

Table 1

Pollutant	CAS[1] Number	Water Quality Criteria µg/L[2]			
		Human Health:		Warm Water Aquatic Habitat[3]:	
		DWS[4]	Fish[5]	Acute	Chronic
Acenaphthene	83329	670	990		
Acrolein	107028	190	290		
Acrylonitrile	107131	0.051	0.25		
Aldrin	309002	0.000049	0.000050	3.0	
alpha-BHC	319846	0.0026	0.0049		
alpha-Endosulfan	959988	62	89	0.22	0.056
Anthracene	120127	8,300	40,000		
Antimony	7440360	5.6	640		
Arsenic	7440382	10.0		340	150
Asbestos	1332214	7 million fibers/L			
Barium	7440393	1,000			
Benzene	71432	2.2	51		
Benzidine	92875	0.000086	0.00020		
Benzo(a)anthracene	56553	0.0038	0.018		

Pollutant	CAS[1] Number	Water Quality Criteria µg/L[2]			
		Human Health:		Warm Water Aquatic Habitat[3]:	
		DWS[4]	Fish[5]	Acute	Chronic
Benzo(a)pyrene	50328	0.0038	0.018		
Benzo(b)fluoranthene	205992	0.0038	0.018		
Benzo(k)fluoranthene	207089	0.0038	0.018		
Beryllium	7440417	4			
Beta-BHC	319857	0.0091	0.017		
Beta-Endosulfan	33213659	62	89	0.22	0.056
bis(chloromethyl)ether	542881	0.00010	0.00029		
bis(2-chloroethyl)ether	111444	0.030	0.53		
bis(2-chloroisopropyl)ether	108601	1,400	65,000		
bis(2-ethylhexyl)phthalate	117817	1.2	2.2		
Bromoform	75252	4.3	140		
Butylbenzyl phthalate	85687	1,500	1,900		
Cadmium	7440439	5		e(1.0166 (ln Hard*)-3.924)	e(0.7409 (ln Hard*)-4.719)
Carbon tetrachloride	56235	0.23	1.6		
Chlordane	57749	0.00080	0.00081	2.4	0.0043
Chloride	16887006	250,000		1,200,000	600,000
Chlorobenzene	108907	680	21,000		
Chlorodibromomethane	124481	0.40	13		
Chloroform	67663	5.7	470		
Chloropyrifos	2921882			0.083	0.041
Chromium	N/A	100			
Chromium (III)	16065831			e(0.8190 (ln Hard*)+3.7256)	e(0.8190 (ln Hard*)+0.6848)
Chromium (VI)	18540299			16	11
Chrysene	218019	0.0038	0.018		
Color	N/A	75 Platinum Cobalt Units			
Copper	7440508	1,300		e(0.9422 (ln Hard*)-1.700)	e(0.8545 (ln Hard*)-1.702)
Cyanide, Free	57125	700	220,000	22	5.2
Demeton	8065483				0.1
Dibenzo(a,h)anthracene	53703	0.0038	0.018		
Dichlorobromomethane	75274	0.55	17		
Dieldrin	60571	0.000052	0.000054	0.24	0.056
Diethyl phthalate	84662	17,000	44,000		
Dimethyl phthalate	131113	270,000	1,100,000		
Di-n-butyl phthalate	84742	2,000	4,500		

Pollutant	CAS[1] Number	Water Quality Criteria µg/L[2]			
		Human Health:		Warm Water Aquatic Habitat[3]:	
		DWS[4]	Fish[5]	Acute	Chronic
Dinitrophenols	25550587	69	5300		
Endosulfan sulfate	1031078	62	89		
Endrin	72208	0.76	0.81	0.086	0.036
Endrin aldehyde	7421934	0.29	0.30		
Ethylbenzene	100414	3,100	29,000		
Fluoranthene	206440	130	140		
Fluorene	86737	1,100	5,300		
Fluoride	N/A	2,000			
Foaming Agents	N/A	500			
gamma-BHC (Lindane)	58899	0.019	0.063	0.95	
Guthion	86500				0.01
Heptachlor	76448	0.000079	0.000079	0.52	0.0038
Heptachlor epoxide	1024573	0.000039	0.000039	0.52	0.0038
Hexachlorobenzene	118741	0.00028	0.00029		
Hexachlorobutadiene	87683	0.44	18		
Hexachlorocyclo-hexane-Technical	319868	0.0123	0.0414		
Hexachlorocyclopentadiene	77474	240	17,000		
Hexachloroethane	67721	1.4	3.3		
Ideno(1,2,3-cd)pyrene	193395	0.0038	0.018		
Iron[6]	7439896			4,000	1,000
Isophorone	78591	35.0	960		
Lead	7439921	15		e(1.273 (ln Hard*)-1.460)	e(1.273 (ln Hard*)-4.705)
Malathion	121755				0.1
Mercury	7439976	2.0	0.051	1.7	0.91
Methoxychlor	72435	40.0			0.03
Methylbromide	74839	47	1,500		
Methylene Chloride	75092	4.6	590		
Mirex	2385855				0.001
Nickel	7440020	610	4,600	e(0.8460 (ln Hard*)+ 2.255)	e(0.8460 (ln Hard*)+ 0.0584)
Nitrate (as N)	14797558	10,000			
Nitrobenzene	98953	17	690		
Nitrosamines, Other	N/A	0.0008	1.24		
N-Nitrosodibutylamine	924163	0.0063	0.22		
N-Nitrosodiethylamine	55185	0.0008	1.24		
N-Nitrosodimethylamine	62759	0.00069	3.0		
N-Nitrosodi-n-Propylamine	621647	0.0050	0.51		
N-Nitrosodiphenylamine	86306	3.3	6.0		

Pollutant	CAS[1] Number	Water Quality Criteria µg/L[2]			
		Human Health:		Warm Water Aquatic Habitat[3]:	
		DWS[4]	Fish[5]	Acute	Chronic
N-Nitrosopyrrolidine	930552	0.016	34		
Parathion	56382			0.065	0.013
Pentachlorobenzene	608935	1.4	1.5		
Pentachlorophenol	87865	0.27	3.0	e(1.005 (pH)-4.869)	e(1.005 (pH)-5.134)
Phthalate esters	N/A				3
Phenol	108952	21,000	1,700,000		
Polychlorinated Biphenyls (PCBs)	N/A	0.000064	0.000064		0.0014
Pyrene	129000	830	4,000		
Selenium	7782492	170	4,200	20	5.0
Silver	7440224			e(1.72 (ln Hard*)-6.59)	
Sulfate	N/A	250,000			
Hydrogen Sulfide, Undissociated	7783064				2.0
Tetrachloroethylene	127184	0.69	3.3		
Thallium	7440280	1.7	6.3		
Toluene	108883	6,800	200,000		
Total Dissolved Solids	N/A	750,000			
Toxaphene	8001352	0.00028	0.00028	0.73	0.0002
Trichloroethylene	79016	2.5	30		
Vinyl Chloride	75014	2.0	530		
Zinc	7440666	7,400	26,000	e(0.8473 (ln Hard*)+ 0.884)	e(0.8473 (ln Hard*)+ 0.884)
1,1-dichloroethylene	75354	0.057	3.2		
1,1,1-trichloroethane	71556	200			
1,1,2-trichloroethane	79005	0.59	16		
1,1,2,2-tetrachloroethane	79345	0.17	4.0		
1,2-dichlorobenzene	95501	2,700	17,000		
1,2-dichloroethane	107062	0.38	37		
1,2-dichloropropane	78875	0.50	15		
1,2-diphenylhydrazine	122667	0.036	0.20		
1,2-trans-dichloroethylene	156605	700	140,000		
1,2,4-trichlorobenzene	120821	260	940		
1,2,4,5-tetrachlorobenzene	95943	0.97	1.1		
1,3-dichlorobenzene	541731	320	960		
1,3-dichloropropene	542756	10	1,700		
1,4-dichlorobenzene	106467	400	2,600		
2-chloronaphthalene	91587	1,000	1,600		
2-chlorophenol	95578	81	150		

Pollutant	CAS[1] Number	Water Quality Criteria µg/L[2]			
		Human Health:		Warm Water Aquatic Habitat[3]:	
		DWS[4]	Fish[5]	Acute	Chronic
2-methyl-4,6-dinitrophenol	534521	13	280		
2,3,7,8-TCDD (Dioxin)	1746016	5.0 E - 9	5.1 E - 9		
2,4-D	94757	70			
2,4-dichlorophenol	120832	77	290		
2,4-dimethylphenol	105679	380	850		
2,4-dinitrophenol	51285	69	5,300		
2,4-dinitrotoluene	121142	0.11	3.4		
2,4,5-TP (Silvex)	93721	10			
2,4,5-trichlorophenol	95954	1,800	3,600		
2,4,6-trichlorophenol	88062	1.4	2.4		
3,3'-dichlorobenzidine	91941	0.021	0.028		
4,4'-DDD	72548	0.00031	0.00031		
4,4'-DDE	72559	0.00022	0.00022		
4,4'-DDT	50293	0.00022	0.00022	1.1	0.001

[1]CAS = Chemical Abstracts Service.
[2]Water quality criteria in µg/L unless reported in different units.
[3]Metal concentrations shall be total recoverable metals to be measured in an unfiltered sample, unless it can be demonstrated to the satisfaction of the cabinet that a more appropriate analytical technique is available that provides a measurement of that portion of the metal present which causes toxicity to aquatic life.
[4]DWS = Domestic Water Supply Source.
[5]Fish = Fish Consumption.
[6]The chronic criterion for iron shall not exceed three and five tenths (3.5) mg/l if aquatic life has not been shown to be adversely affected.
*Hard = Hardness as mg/l $CaCO_3$.

Section 7. Recreational Waters. (1) Primary contact recreation water. The following criteria shall apply to waters designated as primary contact recreation use:

(a) Fecal coliform content or Escherichia coli content shall not exceed 200 colonies per 100 ml or 130 colonies per 100 ml respectively as a geometric mean based on not less than five (5) samples taken during a thirty (30) day period. Content also shall not exceed 400 colonies per 100 ml in twenty (20) percent or more of all samples taken during a thirty (30) day period for fecal coliform or 240 colonies per 100 ml for Escherichia coli. These limits shall be applicable during the recreation season of May 1 through October 31. Fecal coliform criteria listed in subsection (2)(a) of this section shall apply during the remainder of the year.

(b) pH shall be between six and zero-tenths (6.0) to nine and zero-tenths (9.0) and shall not change more than one and zero-tenths (1.0) pH unit within this range over a period of twenty-four (24) hours.

(2) Secondary contact recreation water. The following criteria shall apply to waters designated for secondary contact recreation use during the entire year:

(a) Fecal coliform content shall not exceed 1000 colonies per 100 ml as a thirty (30) day

geometric mean based on not less than five (5) samples; nor exceed 2000 colonies per 100 ml in twenty (20) percent or more of all samples taken during a thirty (30) day period.

(b) pH shall be between six and zero-tenths (6.0) to nine and zero-tenths (9.0) and shall not change more than one and zero-tenths (1.0) pH unit within this range over a period of twenty-four (24) hours.

Section 8. Outstanding State Resource Waters. This designation category includes certain unique waters of the Commonwealth.

(1) Water for inclusion.

(a) Automatic inclusion. The following surface waters shall automatically be included in this category:

1. Waters designated under the Kentucky Wild Rivers Act, KRS 146.200-146.360;
2. Waters designated under the Federal Wild and Scenic Rivers Act, 16 U.S.C. 1271 et seq.;
3. Waters identified under the Kentucky Nature Preserves Act, KRS 146.410-146.530, which are contained within a formally dedicated nature preserve or are published in the registry of natural areas in accordance with 400 KAR 2:080 and concurred upon by the cabinet; and
4. Waters that support federally recognized endangered or threatened species under the Endangered Species Act of 1973, as amended, 16 U.S.C. 1531 et seq.

(b) Permissible consideration. Other surface waters may be included in this category as determined by the cabinet if:

1. The surface waters flow through or are bounded by state or federal forest land, or are of exceptional aesthetic or ecological value or are within the boundaries of national, state, or local government parks, or are a part of a unique geological or historical area recognized by state or federal designation; or
2. The surface water is a component part of an undisturbed or relatively undisturbed watershed that can provide basic scientific data and possess outstanding water quality characteristics; or fulfill two (2) of the following criteria:
   a. Support a diverse or unique native aquatic flora or fauna;
   b. Possess physical or chemical characteristics that provide an unusual and uncommon aquatic habitat; or
   c. Provide a unique aquatic environment within a physiographic region.

(2) Outstanding state resource waters protection. The designation of certain waters as outstanding state resource waters shall fairly and fully reflect those aspects of the waters for which the designation is proposed. The cabinet shall determine water quality criteria for these waters as follows:

(a) At a minimum, the criteria of Section 2 and Table 1 of Section 6 of this administrative regulation and the appropriate criteria associated with the stream use designation assignments in 401 KAR 5:026, shall be applicable to these waters.

(b) If the values identified for an outstanding state resource water are dependent upon or related to instream water quality, the cabinet shall review existing water quality criteria and determine if additional criteria or more stringent criteria are necessary for protection, and evaluate the need for the development of additional data upon which to base the determination. Existing water quality and habitat shall be maintained and protected in those waters designated as outstanding state resource waters that support federally threatened and endangered species of aquatic organisms, unless it can be demonstrated to the satisfaction of the cabinet, that lowering of water quality or a habitat modification will not have a harmful effect on the threatened or

endangered species which the water supports.

(c) Adoption of more protective criteria in accordance with this section shall be listed with the respective stream segment in 401 KAR 5:026.

(3) Determination of designation.

(a) Any person may present a proposal to designate certain waters under this section. Documentation requirements in support of an outstanding state resource water proposal shall contain those elements outlined in 401 KAR 5:026, Section 3(3)(a) through (h).

(b) The cabinet shall review the proposal and supporting documentation to determine whether the proposed waters qualify as outstanding state resource waters within the criteria established by this administrative regulation. The cabinet shall document the determination to deny or to propose redesignation, and a copy of the decision shall be served upon the petitioner and other interested parties.

(c) After considering all of the pertinent data, a redesignation, if appropriate, shall be made pursuant to 401 KAR 5:026.

Section 9. Water Quality Criteria for the Main Stem of the Ohio River. The following criteria apply to the main stem of the Ohio River from its juncture with the Big Sandy River at River Mile 317.1 to its confluence with the Mississippi River, and shall not be exceeded. These waters are subject to all applicable provisions of 401 KAR 5:002, 5:026, 5:029, 5:030, and this administrative regulation.

(1) Dissolved oxygen. Concentrations shall average at least five and zero-tenths (5.0) mg/l per calendar day and shall not be less than four and zero-tenths (4.0) mg/l except during the April 15-June 15 spawning season when a minimum of five and one-tenth (5.1) mg/l shall be maintained.

(2) Temperature.

(a) Allowable stream temperatures are:

Month/Date	Period Average (°F)	Instantaneous Maximum (°F)
January 1-31	45	50
February 1-29	45	50
March 1-15	51	56
March 16-31	54	59
April 1-15	58	64
April 16-30	64	69
May 1-15	68	73
May 16-31	75	80
June 1-15	80	85
June 16-30	83	87
July 1-31	84	89
August 1-31	84	89
September 1-15	84	87
September 16-30	82	86
October 1-15	77	82
October 16-31	72	77
November 1-30	67	72

December 1-31	52	57

(b) A successful demonstration conducted for thermal discharge limitations under Section 316(a) of the Clean Water Act shall constitute compliance with these temperature criteria.

(3) Maximum allowable instream concentrations for specific pollutants for the protection of human health are listed in Table 2 of subsection (4) of this section. They shall be met at the edge of the assigned mixing zone.

(4) To provide for the protection of warm water aquatic life habitats, the criteria in Table 2 of this subsection shall be met at the edge of the assigned mixing zone.

Table 2

Pollutant	**Human Health Criteria in µg/L[1]**	**Warm Water Aquatic Habitat Criteria in µg/L[2]**	
		Acute	**Chronic**
Arsenic	10.0		
Barium	2,000		
Cadmium		e(1.0166 (ln Hard*)-3.924)	e(0.7409 (ln Hard*)-4.719)
Chloride	250,000		
Chromium, hexavalent		16	11
Copper		e(0.9422 (ln Hard*)-1.700)	e(0.8545 (ln Hard*)-1.702)
Cyanide, Free		22	5.2
Fluoride	2,000		
Lead		e(1.273 (ln Hard*)-1.460)	e(1.273 (ln Hard*)-4.705)
Mercury		1.7	0.91
Nickel		e(0.8460 (ln Hard*)+2.255)	e(0.8460 (ln Hard*)+0.0584)
Nitrite + Nitrate Nitrogen	10,000		
Nitrite – Nitrogen	1,000		
Phenolics	5		
Silver	100	e(1.72 (ln Hard*)-6.59)	
Sulfate	250,000		
Zinc		e(0.8473 (ln Hard*)+0.884)	e(0.8473 (ln Hard*)+0.884)

[1]Metal concentrations, for the purposes of human health criteria, shall be total recoverable values except hexavalent chromium, which is dissolved.

[2]Metal concentrations, for the purposes of warm water aquatic habitat criteria, shall be total recoverable metals to be measured in an unfiltered sample, unless it can be demonstrated to the satisfaction of the cabinet that a more appropriate analytical technique is available that provides a measurement of that portion of the metal present which causes toxicity to aquatic life.

*Hard = Hardness as mg/l $CaCO_3$

(5) The net discharge of aldrin, dieldrin, DDT, including DDD and DDE, endrin, toxaphene, benzidine, and PCBs is prohibited.

Section 10. Exceptions to Criteria for Specific Surface Waters. (1) The cabinet may grant exceptions to the criteria contained in Sections 2, 4, 6, 7, 8, and 9 of this administrative regulation upon demonstration by an applicant that maintenance of applicable water quality criteria is not attainable or scientifically valid but the use designation is still appropriate. This determination shall be made on a case-by-case basis with respect to a specific surface water following an analysis for each area.

(2) The analysis shall show that the water quality criteria cannot be reasonably achieved either on a seasonal or year- round basis due to natural conditions, or site-specific factors differing from the conditions used to derive criteria in Sections 2, 4, 6, 7, 8, and 9 of this administrative regulation. Site-specific criteria shall be developed by the applicant utilizing toxicity tests, indicator organisms, and application factors that are consistent with those outlined in Chapter 3 of "Water Quality Standards Handbook", EPA, 1994, incorporated by reference in Section 12 of this administrative regulation. In addition, an applicant shall supply the documentation listed in 401 KAR 5:026, Section 3.

(3) An exception to criteria listed in Table 1 of Section 6 of this administrative regulation for the protection of human health from the consumption of fish tissue may be granted if it can be demonstrated that natural, ephemeral, intermittent or low flow conditions or water levels preclude the year-round support of a fishery, unless these conditions may be compensated for by the discharge of sufficient volume of effluent discharges.

(4) Before granting an exception to water quality criteria, the cabinet shall ensure that the water quality standards of downstream waters are attained and maintained.

(5) All exceptions to water quality criteria shall be subject to review at least every three (3) years.

(6) Exceptions to water quality criteria shall be adopted as an administrative regulation by listing them with the respective surface water in 401 KAR 5:026.

Section 11. Exceptions to Criteria for Individual Dischargers. (1) An exception to criteria may be granted to an individual discharger based on a demonstration by the discharger, following the guidelines in "Interim Economic Guidance for Water Quality Standards Workbook", EPA March 1995 incorporated by reference in Section 12 of this administrative regulation, that KPDES permit compliance with existing instream criteria shall result in substantial and widespread adverse economic and social impacts.

(2) The demonstration shall include an assessment of alternative pollution control strategies and biological assessments that indicated designated uses are being met.

(3) Before granting an exception, the cabinet shall ensure that the water quality standards of downstream waters are attained and maintained.

(4) All exceptions shall be submitted to the cabinet for review at least every three (3) years. Upon review, the discharger shall demonstrate to the cabinet that a reasonable effort has been made to reduce the pollutants in the discharge to levels that would achieve existing applicable water quality criteria.

(5) The highest level of effluent quality that can be economically and technologically achieved shall be ensured while the exception is in effect.

(6) The Kentucky Pollution Discharge Elimination System permitting program shall be the mechanism for the review and public notification of intentions to grant exceptions to criteria.

Section 12. Incorporation by Reference. (1) The following material is incorporated by

reference:

(a) "Water Quality Standards Handbook-Chapter 3", EPA August 1994, Publication EPA-823-B-94-005a, U.S. Environmental Protection Agency, Office of Water, Washington, D.C.

(b) "Interim Economic Guidance for Water Quality Standards Workbook", EPA March 1995, Publication EPA-823-B-95-002, U.S. Environmental Protection Agency, Office of Water, Washington, D.C.

(2) This material may be inspected, copied, or obtained, subject to applicable copyright law, at the Division of Water, 14 Reilly Road, Frankfort, Kentucky, Monday through Friday, 8 a.m. to 4:30 p.m.

401 KAR 5:031 Approved for promulgation:

12/3/2003
Date

Henry C. List, Secretary
Natural Resources and Environmental
Protection Cabinet